

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 November 2002 (21.11.2002)

PCT

(10) International Publication Number  
**WO 02/091889 A2**

(51) International Patent Classification<sup>7</sup>: **A47J**  
(21) International Application Number: **PCT/EP02/05153**  
(22) International Filing Date: **10 May 2002 (10.05.2002)**  
(25) Filing Language: **English**  
(26) Publication Language: **English**  
(30) Priority Data:  
**MI2001A000972** **11 May 2001 (11.05.2001)** **IT**  
(71) Applicant (for all designated States except US): **DE' LONGHI S.P.A. [IT/IT]; Via L. Seitz, 47, I-31100 Treviso (IT).**

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declaration under Rule 4.17:**

— of inventorship (Rule 4.17(iv)) for US only

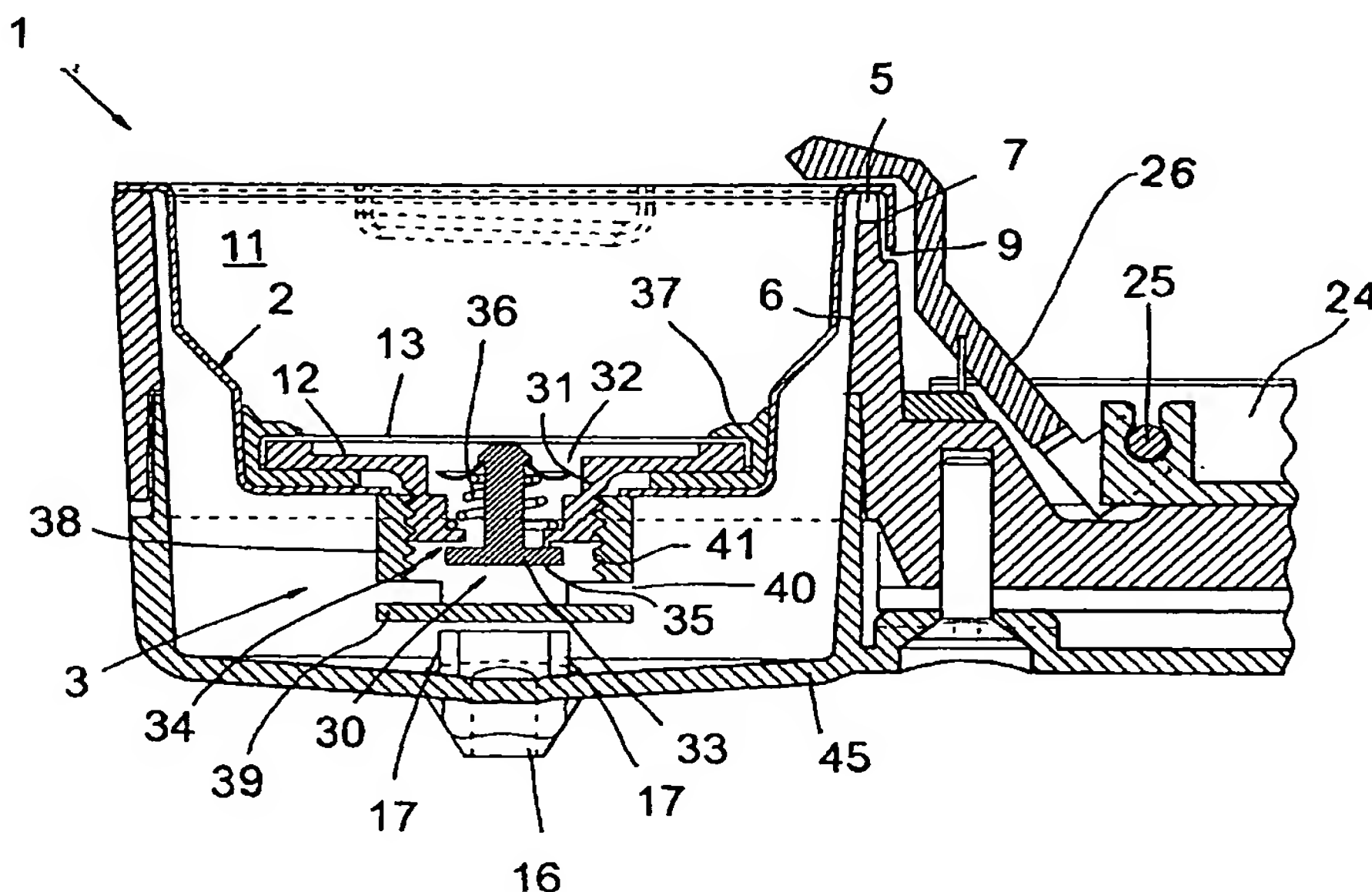
**Published:**

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(72) Inventor; and  
(75) Inventor/Applicant (for US only): **DE' LONGHI, Giuseppe [IT/IT]; Vicolo Rovero 1, I-31100 Treviso (IT).**  
(74) Agent: **RAPISARDI, Mariacristina; Ufficio Brevetti Rapisardi S.r.l., Via Serbelloni, 12, I-20122 Milano (IT).**

(54) Title: **FILTERING-HOLDING CUP FOR A COFFEE MACHINE AND PROCEDURE FOR PRODUCING A DRINK OF COFFEE**



(57) Abstract: The filter-holding cup (1) for a coffee machine comprises a dispenser (3), associated with the filter (2), suitable for spraying a drink of coffee against a side surface extending substantially perpendicular with respect to the surface of a filtering wall (13) of the filter.

Filtering-holding cup for a coffee machine and  
procedure for producing a drink of coffee

DESCRIPTION

The present invention refers to a filter-holding cup for a coffee machine and to a procedure for producing a drink of coffee.

As is known, coffee machines have a filter-holding cup in which the filter is inserted.

The filter usually has a flat structure and is equipped with a plurality of small sized through holes which allow the drink to pass through but which contain the coffee powder.

Moreover, the filter in some cases carries a dispenser which sprays the drink of coffee against the base of the cup, so as to produce a minimum amount of froth.

The drink of coffee produced with traditional cups is finally relenhanced through two lower openings to fill two coffee cups.

Nevertheless in traditional cups the distribution of the drink to the two openings (and therefore to the two coffee cups) is not uniform, i.e. the drink usually tends to head towards one of the openings according to how the liquid jet is directed.

This can be due both to the elastic characteristics of the dispenser itself and to possible impurities which could partially block its passage.

Moreover, cups of the traditional type allow drinks of coffee to be produced which have a small amount of froth.

The technical task proposed for the present invention is,

therefore, that of eliminating the outlined technical drawbacks of the prior art, realising a filter-holding cup for a coffee machine which allows the drink itself to be distributed uniformly between the discharge openings.

In this technical task a purpose of the invention is that of realising a filter-holding cup for a coffee machine and a procedure for producing a drink of coffee which allow a drink of coffee with a lot of froth to be produced.

The last but not least purpose of the invention is that of realising a filter-holding cup for a coffee machine which allows access to all of its components and which, therefore, can be cleaned in a fast and simple manner. The technical task, as well as these and other purposes, according to the present invention are achieved by realising a filter-holding cup for a coffee machine, characterised in that it comprises a dispenser, associated with said filter, suitable for spraying a drink of coffee against a side surface extending substantially perpendicular with respect to the surface of a filtering wall of said filter.

The present finding also refers to a procedure for producing a drink of coffee, characterised in that the ready formed drink of coffee is sprayed through a dispenser capturing a first amount of air and forming froth, and is mixed with a flow of air capturing a second amount of air and forming further froth.

Other characteristics of the present invention are defined,

moreover, in the other claims.

Further characteristics and advantages of the invention shall become clearer from the description of a preferred but not exclusive embodiment of the filter-holding cup for a coffee machine and of the procedure for producing a drink of coffee according to the finding, where the cup is illustrated for indicating and not limiting purposes in the attached-drawings, in which:

- figure 1 shows a schematic longitudinal section view of a portion of cup according to the finding;
- figure 2 shows a cross section of a first embodiment of the filter according to the finding;
- figure 3 shows a 90° rotated section view of the filter of figure 2;
- figure 4 shows a cross section of a second embodiment of the filter according to the finding;
- figure 5 shows a 90° rotated section view of the filter of figure 4;
- figure 6 shows a cross section of a third embodiment of the filter according to the finding; and
- figure 7 shows a 90° rotated section view of the filter of figure 6.

The cup 1 comprises a dispenser 3, associated with the filter 2, suitable for spraying a drink of coffee against a side surface extending substantially perpendicular with respect to

the surface of a filtering wall 13 of the filter.

The dispenser 3 is connected to a base of the filter 2, preferably in a central position, and is housed in a chamber defined between the filter 2 itself and the cup 1.

Advantageously, an enhanced passage of air is defined between the cup 1 and the filter 2.

Such an enhanced passage comprises a groove 5 of the free edge of the cup 1, and an interspace 6 defined between the cup 1 and the filter itself 2.

Moreover, since the dispenser 3 must preferably spray the drink of coffee near to the enhanced passage 5, 6, the cup 1 and/or the filter 2 have set reciprocal positioning means which comprise a bent tab 7, which protrudes from the free edge 8 of the filter 2.

The tab 7 is inserted into a grooved seat 9 of the cup 1.

The dispenser 3 duly comprises a self-cleaning device 30 capable of allowing the automatic expulsion of possible residue or coffee particles which could hinder, as shall be specified more clearly, the formation of froth.

The self-cleaning device 30 comprises a disk element 31 having at its centre a passage 32 for the drink of coffee coming out of the filtering wall 13.

Inside the passage 32 a valve 33 for closing said passage is housed.

Between the valve and the disk element a hole 34 is foreseen

to let out the drink of coffee.

The valve 33 has a disk 35 and is mobile in said housing in contrast to and by means of the action of elastic means and in particular of a spring 36.

In the case of the hole 34 being blocked by residue or coffee particles the increase in pressure determines the displacement of the disk 35 equally allowing the dispensing of the drink of coffee and, consequently, allowing the body which blocked the hole 34 to be carried away.

The filter 2 has an annular gasket 37 to associate the disk element with the filtering wall and at the same time to realise a seal on the sides and on the base of the filter 2.

At the bottom of the disk element there is a bush 38 for attaching said disk element and said filtering wall to said filter.

The bush has a base 39 and at least two slits 40 through which the drink of coffee can escape.

With this solution, advantageously, the drink of coffee coming out of the hole 34 is directed against the surface of the bush defined by the threads thereof which are arranged on the front of the outlet hole 34.

In this way there is an air back-flow through the slits 40 which mixes with the drink of coffee sprayed against the threads 41.

Such a solution allows a substantial formation of froth to



be obtained which is then dispensed into the plastic bottom 45 of the cup and from here through the openings 16 into the coffee cups.

The cup 1, moreover, has a first chamber 11 inside the filter 2, and a second chamber 12 interposed between the filtering wall 13 of the filter 2 and the dispenser 3.

In a different embodiment of the cup 1 according to the finding (shown in figures 2 and 3) such a filtering wall 13 constitutes the base of the filter; however, in other embodiments (for example shown in figures 2 and 3) the filtering wall 13 is connected inside the filter 2 in a removable or non-removable manner.

When the filtering wall 13 is inside the filter 2 (figures 4 and 5, 6 and 7), the base 13' of the filter 2 has an opening 15 for the passage of the drink of coffee to feed the dispenser 3.

In correspondence with the openings 16 the cup 1 has raised ribs 17 for guiding the drink of coffee.

Such ribs 17 are arranged perpendicular to the flow of the drink of coffee so that said coffee, after having hit the threads 41 and having escaped through the slits 40, runs on the bottom 45 up to the opening 16.

In this way one manages to guarantee a very uniform dispensing between the two openings 16.

In the examples shown in figures 2-7, the dispenser 3 comprises a passage which has at least one substantially

converging first portion, preferably formed in an element made of elastically ductile material such as rubber or plastic.

The passage also has a second portion 21 which is inclined with respect to the first portion 18 and which is arranged substantially vertically.

Moreover, the dispenser 3 comprises a rigid element 22, connected to the filter 2, suitable for at least partially containing the elastically ductile element 19.

Moreover, as shown in figures 2, 3, 4 and 5, a portion of the passage is bound by the rigid element 22 itself and the elastically ductile element 19 is removably connected between the base of the filter 2 and the rigid element 22.

Advantageously, the passage 18, 21 realised in this way tends not to become blocked or at least only becomes blocked to a very limited degree.

Moreover, the passage 18, 21 can be cleaned and freed of possible elements which might block it in a very simple manner.

In the embodiment shown in figures 2 and 3 the rigid element 22 is removably connected on guides 23 integral with the base of the filter 2.

In this solution the rigid element 22 can be removed and, together with this, the element made of ductile material 19 can also be removed.

The cup 1 according to the finding also comprises a handle 24 to be connected, which allows the cup 1 to be mounted onto



and detached from the machine in a very simple and fast manner.

The handle 24 has a pivot 25 to which a hooking element 26 is rotatably connected suitable for locking a portion of the filter 2 against a corresponding portion of the cup 1, when the coffee powder contained in the filter 2 is discharged.

The operation of the filter-holding cup for a coffee machine according to the invention can be seen clearly from that which has been described and illustrated and, in particular, it is substantially the following.

The water crosses the chamber 11 of the filter 2 and forms the drink of coffee which, passing through the filtering wall 13 is introduced into the chamber 12.

In the solution represented in figure 1, from the chamber 12 the drink enters into the passage 32 and comes out of the hole 34 in a direction which is substantially parallel to the filtering wall 13.

Then the drink is sprayed against the surface and the threads 41 of the bush 38 capturing bubbles of air and forming a substantial froth.

At the same time the air flows back from the enhanced passage 5 and 6 and from the slits 40 with a further capturing of air in the drink and formation of froth.

The froth then comes out of the slits 40 and the two openings 16.

In the embodiments shown in figures 2-7, from the chamber 12

the drink of coffee enters into the portion 21 of the passage and then into the converging portion 18.

The converging portion 18 is always directed towards the side wall of the bottom 45 and, therefore, always sprays the drink of coffee against such a wall forming froth.

Even when due to pressure the end of the passage deforms the drink is still sprayed against the side wall of the bottom 45 and, swirling around the ribs 17, the drink is dispensed by the two openings in practically equal amounts.

Moreover, the emission of the drink from the cup draws in air from the enhanced passage 5 and 6 which is introduced into the cup 1 and mixes with the drink of coffee with a further capturing of air in the drink and the formation of froth.

The cleaning operations are all extremely simple to carry out because the cup according to the finding is capable of being completely disassembled, to allow access to all of its parts.

A procedure for producing a drink of coffee is also object of the present invention.

According to such a procedure the ready formed drink of coffee is sprayed through the dispenser 3, capturing a first amount of air and forming froth, and is subsequently mixed with a flow of air, capturing a second amount of air and forming further froth.

In this way the drink of coffee which is obtained is very rich in froth.

In a preferred embodiment of the procedure the drink of coffee is formed inside the filter-holding cup 1 and, when it is released from the cup 1 through the openings 16, it draws in the current of air which mixes with the drink of coffee subsequently sprayed by the dispenser 3.

In practice it has been noted how the filter-holding cup for a coffee machine and a procedure for producing a drink of coffee according to the invention are particularly advantageous because they allow a drink of coffee which is rich in froth to be formed and, at the same, they allow such a drink to be distributed in a uniform manner to two (or more) coffee cups.

The filter-holding cup for a coffee machine and the procedure for producing a drink of coffee thus conceived are susceptible to numerous modifications and variants, all covered by the inventive concept; moreover, all of the details can be replaced with technically equivalent elements.

In practice, the materials used, as well as the sizes, can be whatever according to the requirements and the state of the art.

## CLAIMS

1. Filter-holding cup (1) of a coffee machine, characterised in that it comprises a dispenser (3), associated with said filter (2), suitable for spraying a drink of coffee against a side surface extending substantially perpendicular with respect to the surface of a filtering wall (13) of said filter.

2. Cup (1) according to claim 1, characterised in that it comprises an enhanced air passage (5, 6) defined between said cup (1) and said filter (2).

3. Cup (1) according to one or more of the previous claims, characterised in that said enhanced passage (5, 6) comprises at least one groove (5) of a free edge of said cup, and an interspace (6) between said cup (1) and said filter (2).

4. Cup (1) according to one or more of the previous claims, characterised in that it comprises set arrangement means (7, 9) of said filter (2) with respect to said cup (1).

5. Cup (1) according to one or more of the previous claims, characterised in that said set arrangement means (7, 9) comprise a bent tab (7) protruding from a portion of free edge (8) of said filter (2) and inserted in a grooved seat (9) of said cup (1).

6. Cup (1) according to one or more of the previous claims, characterised in that said dispenser (3) comprises a self-cleaning device (30).

7. Cup (1) according to one or more of the previous claims,

characterised in that said self-cleaning device comprises a disk element (31) having at its centre a passage (32) for housing a valve (33) for closing said passage, between said valve and said disk element being foreseen an outlet hole (34) for said drink of coffee.

8. Cup (1) according to one or more of the previous claims, characterised in that said valve has a disk (35) which is mobile in said housing in contrast to and by means of the action of elastic means (36).

9. Cup (1) according to one or more of the previous claims, characterised in that it has an annular gasket (37) for associating said disk element with said filtering wall.

10. Cup (1) according to one or more of the previous claims, characterised in that it comprises a bush (38) for attaching said disk element and said filtering wall to said filter.

11. Cup (1) according to one or more of the previous claims, characterised in that said bush has a base (39) and at least two outlet slits (40) of said drink.

12. Cup (1) according to one or more of the previous claims, characterised in that said surface is defined by the threads (41) of said bush arranged on the front of said outlet hole of said drink in a direction substantially perpendicular to said surface.

13. Cup (1) according to one or more of the previous claims, characterised in that it comprises at least one first chamber

(11) inside said filter (2), and a second chamber (12) interposed between the filtering wall (13) of said filter (2) and said dispenser (3).

14. Cup (1) according to one or more of the previous claims, characterised in that said filtering wall (13) is connected to the inside of said filter (2), and the base (13') of said filter (2) has at least one opening (15) for the passage of said drink of coffee to said dispenser (3).

15. Cup (1) according to one or more of the previous claims, characterised in that in correspondence with discharge openings (16) of said drink of coffee formed on a base of said cup (1), said cup (1) has raised ribs (17) for guiding said drink of coffee.

16. Cup (1) according to one or more of the previous claims, characterised in that said ribs (17) are arranged perpendicular to the flow of said drink of coffee.

17. Cup (1) according to one or more of the previous claims, characterised in that said dispenser (3) comprises at least one passage having at least one first substantially converging portion (18).

18. Cup (1) according to one or more of the previous claims, characterised in that at least said first portion (18) of said passage is formed in an element (19) made out of elastically ductile material.

19. Cup (1) according to one or more of the previous claims,



characterised in that said passage has at least one second portion (21) which is inclined with respect to said first portion.

20. Cup (1) according to one or more of the previous claims, characterised in that said dispenser (3) comprises a rigid element (22), connected to said filter (2), suitable for at least partially containing said elastically ductile element (19).

21. Cup (1) according to one or more of the previous claims, characterised in that at least one portion of said passage is bound by said rigid element (22).

22. Cup (1) according to one or more of the previous claims, characterised in that said elastically ductile element (19) is removably connected between a base of said filter (2) and said rigid element (22).

23. Cup (1) according to one or more of the previous claims, characterised in that said rigid element (22) is removably connected on guides (23) integral with said filter (2).

24. Cup (1) according to one or more of the previous claims, characterised in that it comprises a handle (24) connected to said cup (1), said handle (24) carrying a hooking element (26) rotatably connected, suitable for locking a portion of said filter (2) against a corresponding portion of said cup (1) when the coffee powder contained in said filter (2) is discharged.

25. Procedure for producing a ready formed drink of coffee,

characterised in that the ready formed drink of coffee is sprayed through a dispenser capturing a first amount of air and forming froth, and is mixed with a flow of air capturing a second amount of air and forming further froth.

26. Procedure according to the previous claim, characterised in that the drink of coffee is formed inside a filter-holding cup (1) and, when it is released from the cup (1), it draws in the current of air which strikes the drink of coffee subsequently sprayed by a dispenser (3).

27. Filter-holding cup for a coffee machine and procedure for producing a drink of coffee, all as described and claimed.

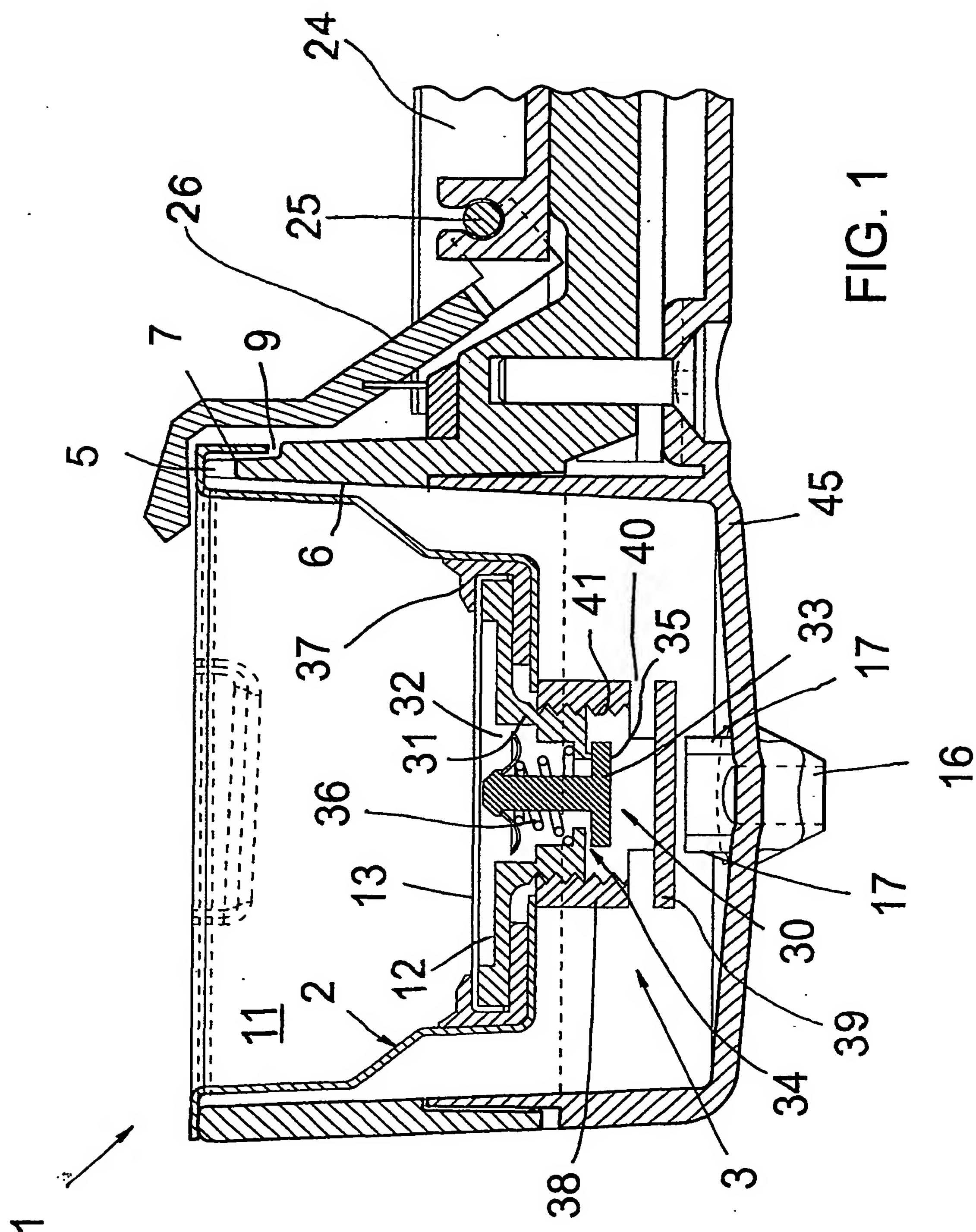


FIG 2

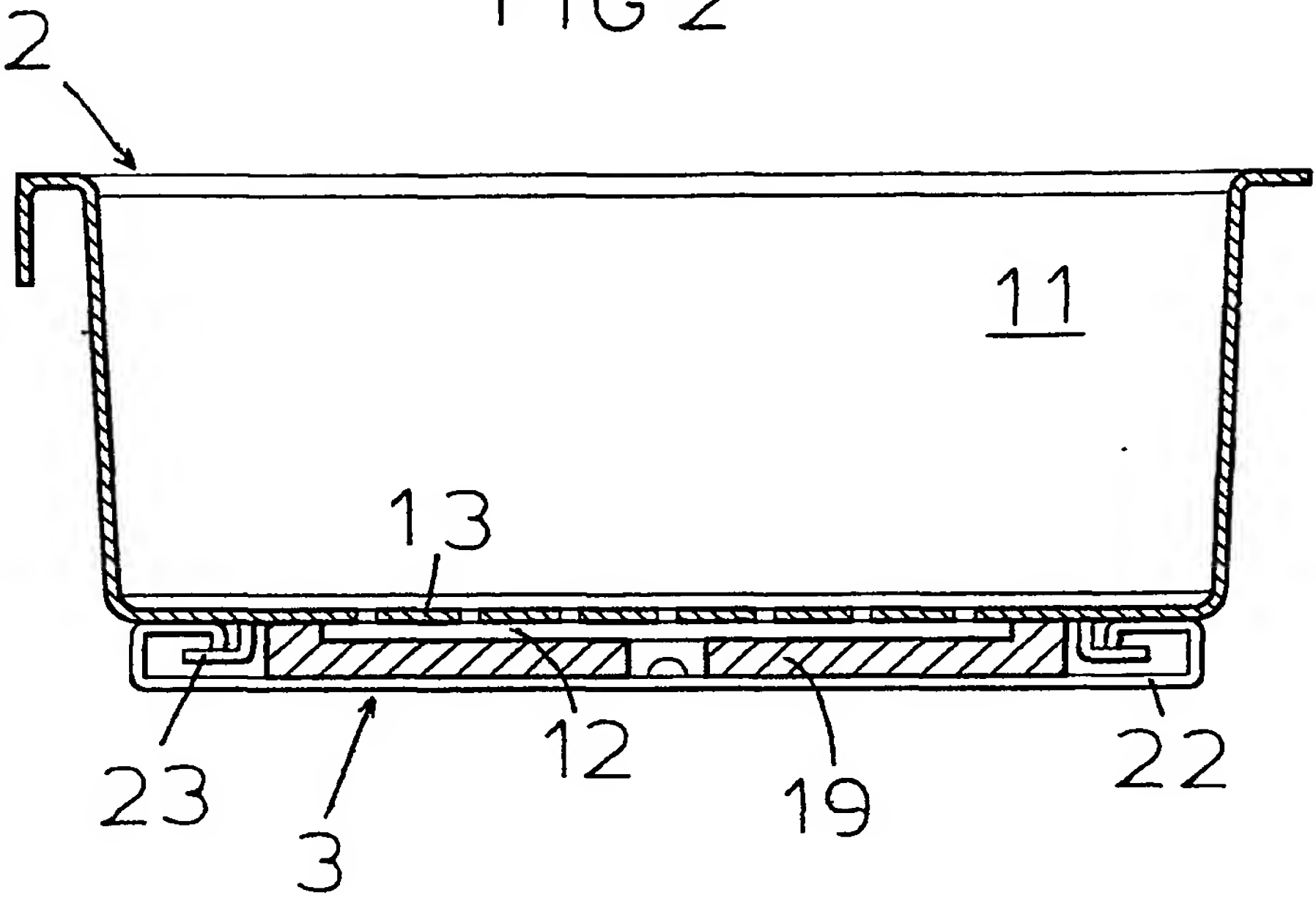
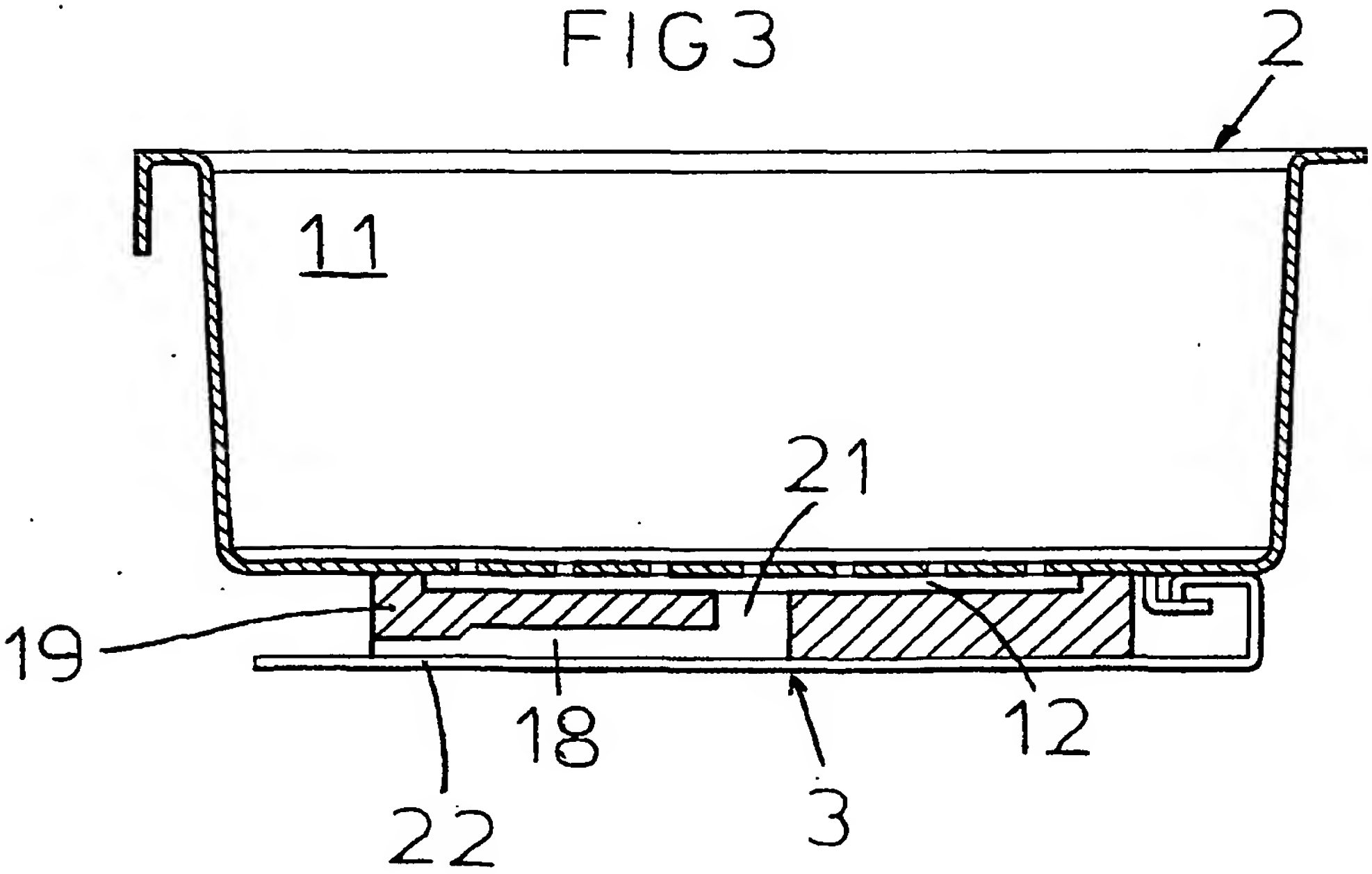
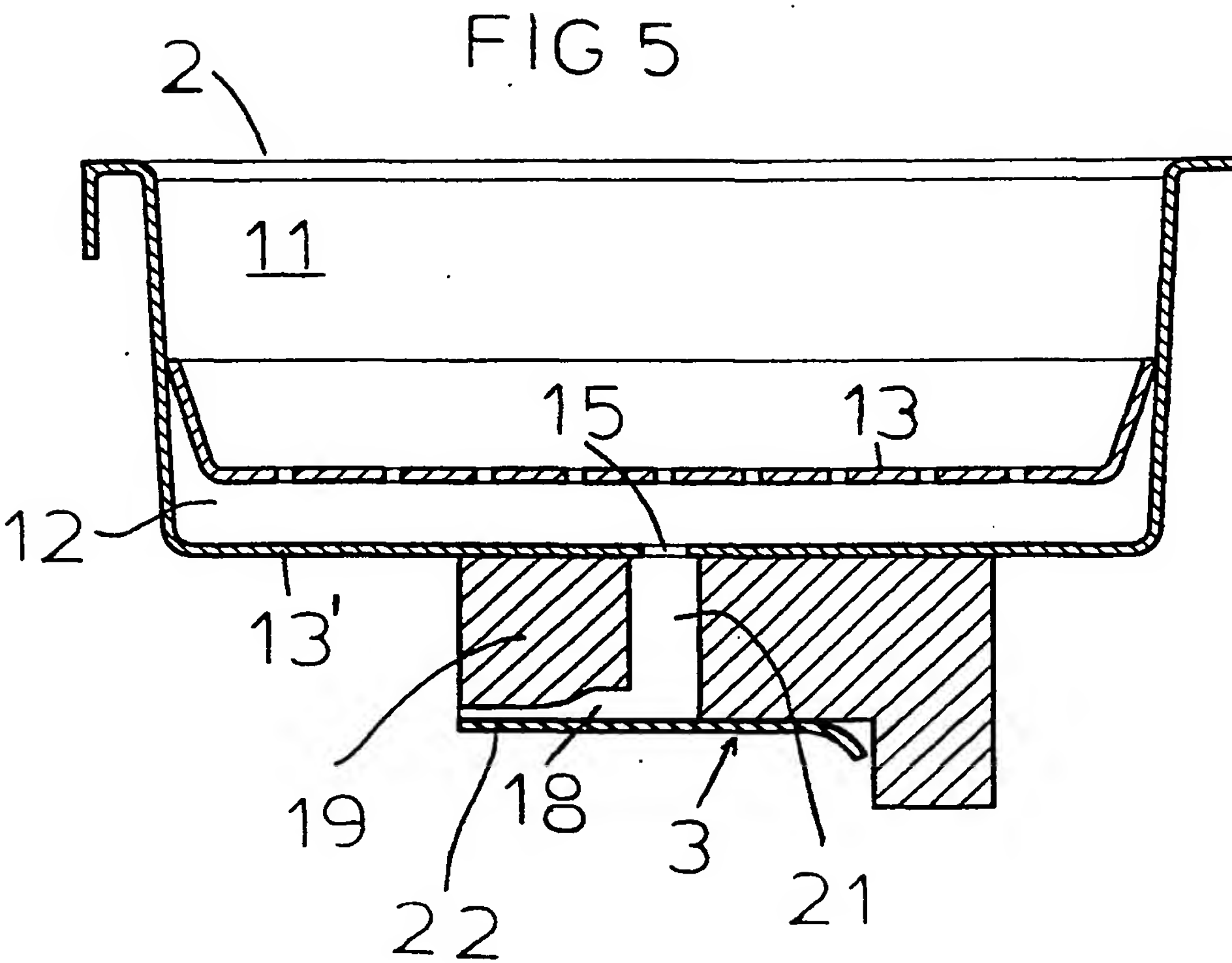
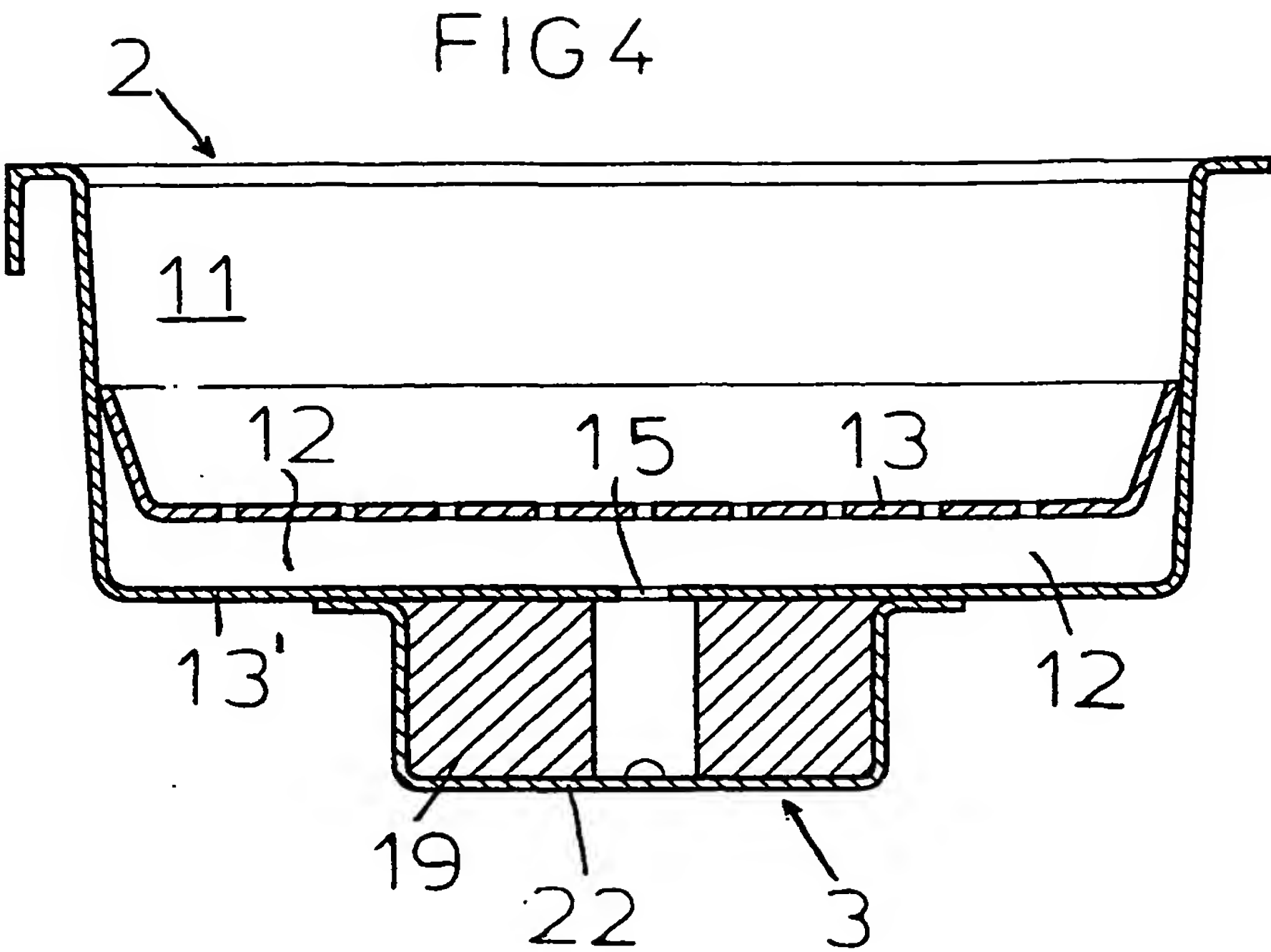
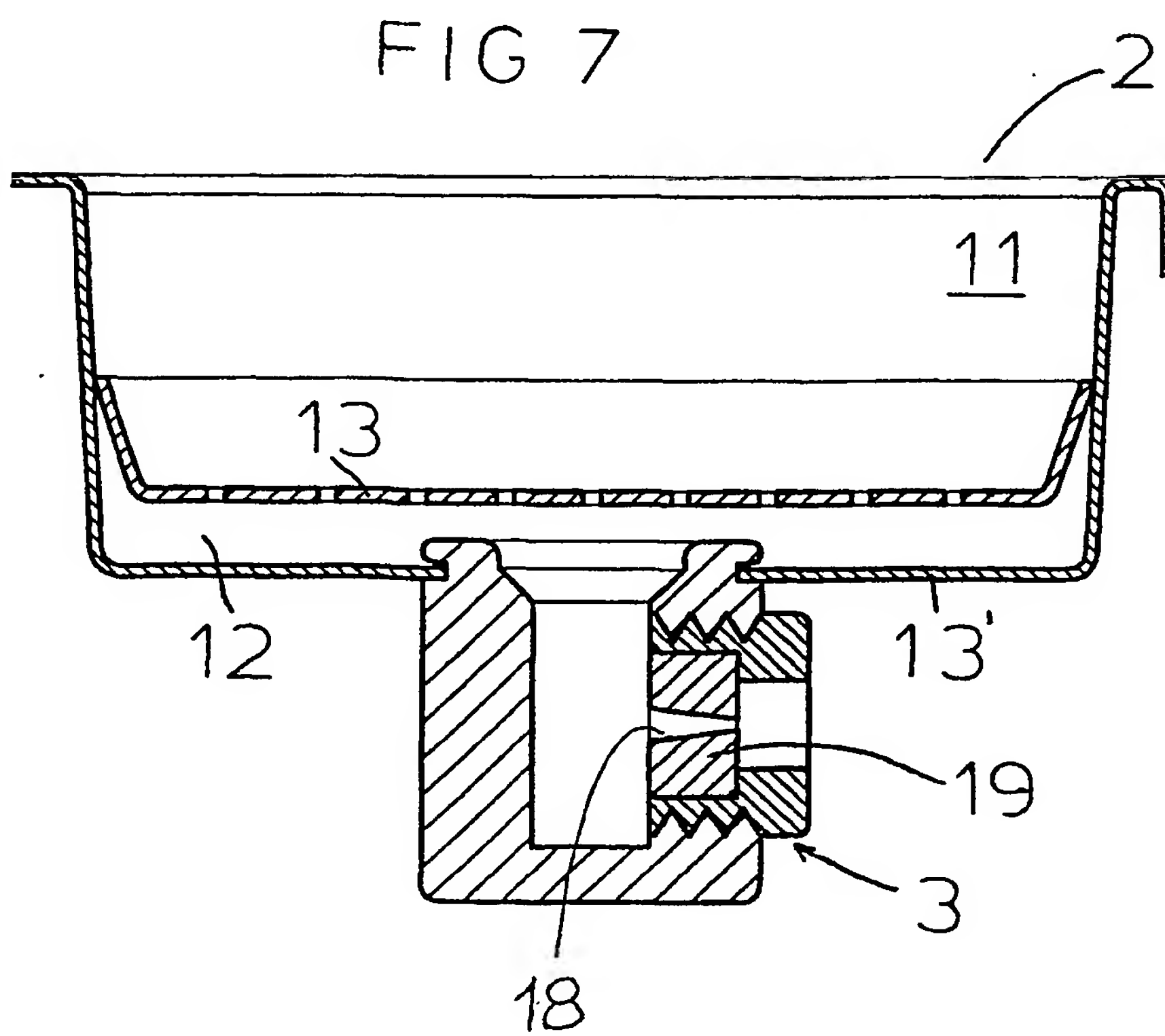
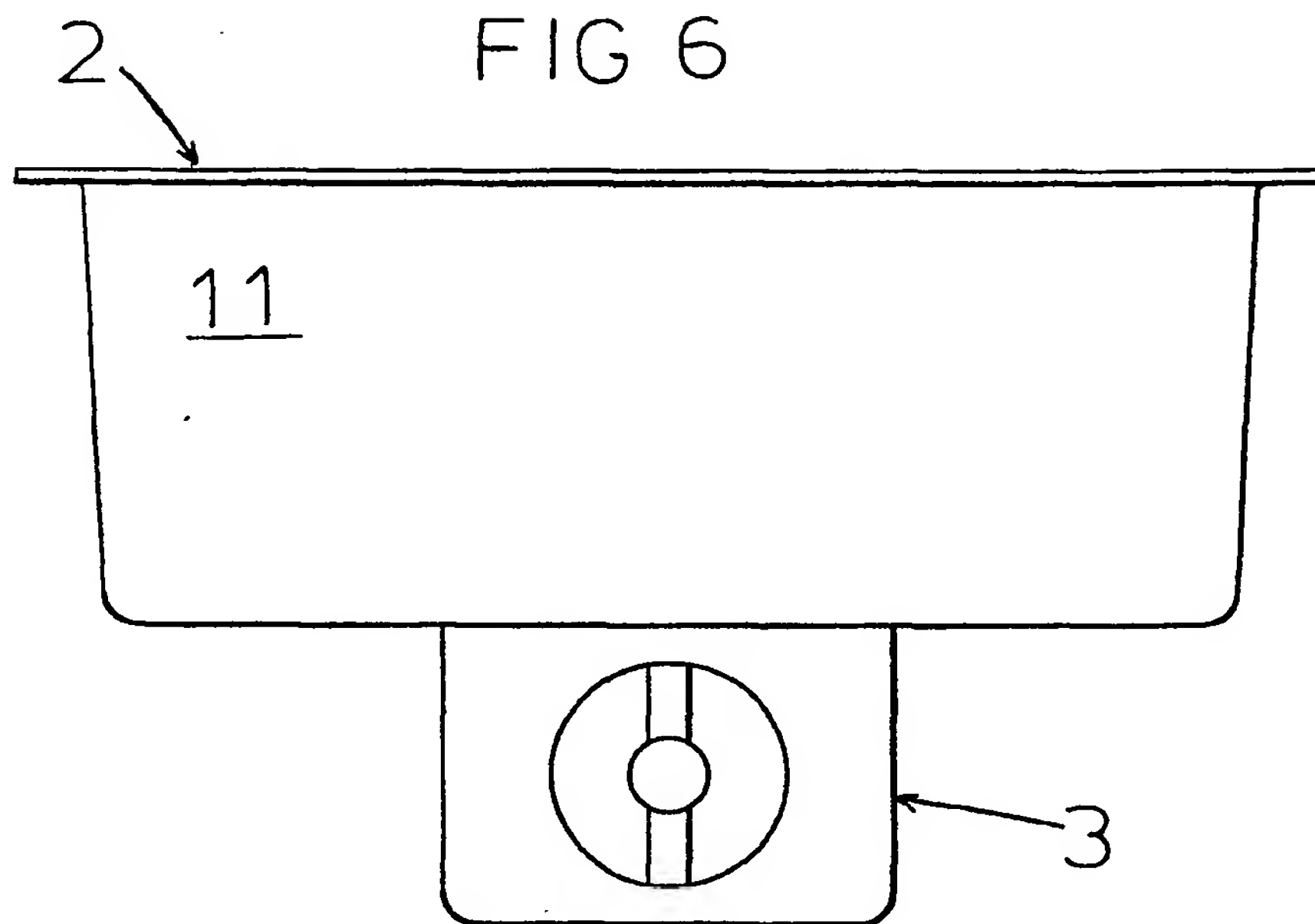


FIG 3









(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 November 2002 (21.11.2002)

PCT

(10) International Publication Number  
**WO 02/091889 A3**

(51) International Patent Classification<sup>7</sup>: **A47J 31/06**

(21) International Application Number: **PCT/EP02/05153**

(22) International Filing Date: **10 May 2002 (10.05.2002)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:  
**MI2001A000972 11 May 2001 (11.05.2001) IT**

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(74) Agent: **RAPISARDI, Mariacristina; Ufficio Brevetti Rapisardi S.r.l., Via Serbelloni, 12, I-20122 Milano (IT).**

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**CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.**

(84) Designated States (*regional*): **ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).**

**Declaration under Rule 4.17:**

**— of inventorship (Rule 4.17(iv)) for US only**

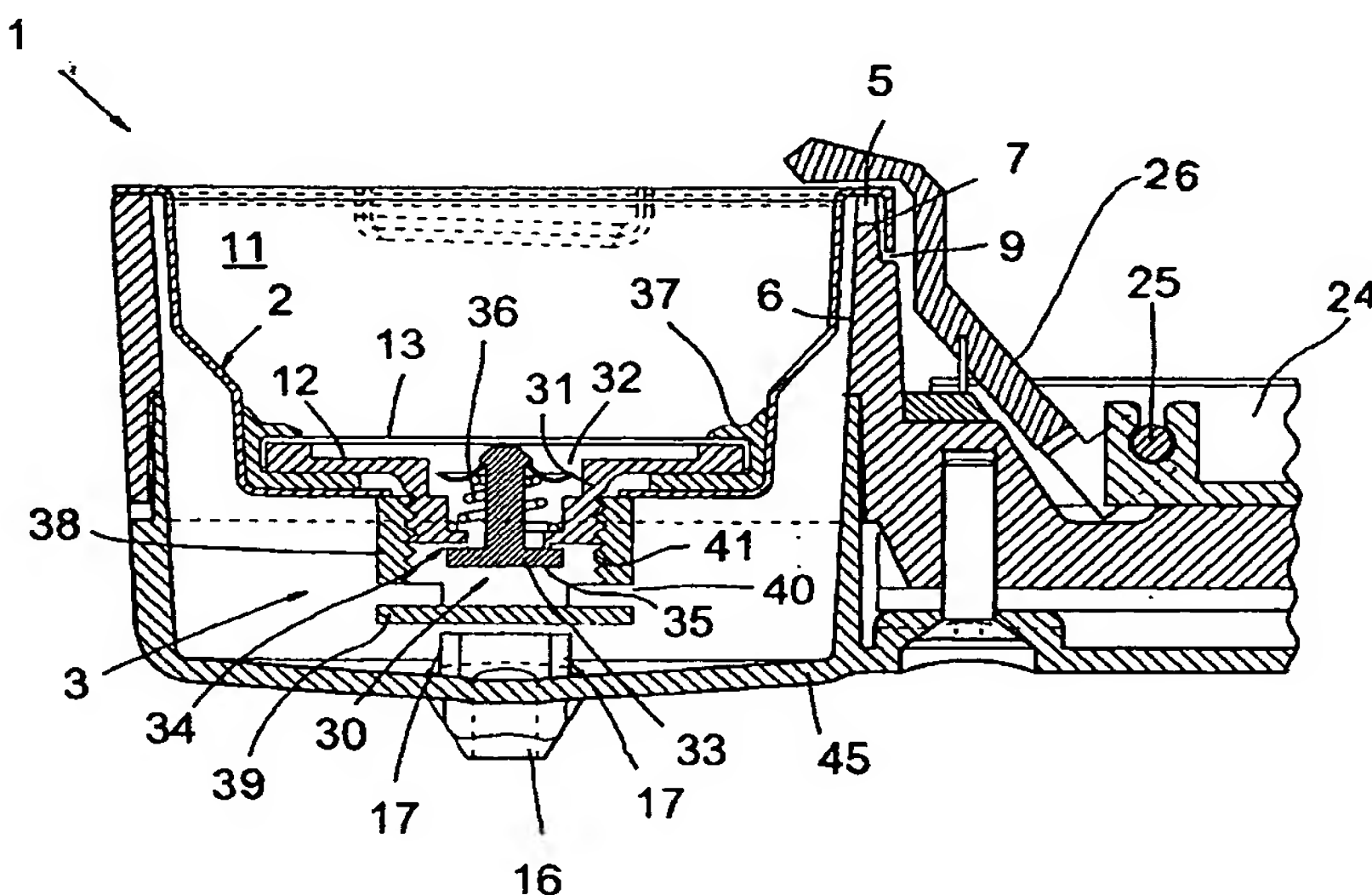
**Published:**

**— with international search report**

(88) Date of publication of the international search report:  
**18 December 2003**

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **FILTERING-HOLDING CUP FOR A COFFEE MACHINE AND PROCEDURE FOR PRODUCING A DRINK OF COFFEE**



(57) Abstract: The filter-holding cup (1) for a coffee machine comprises a dispenser (3), associated with the filter (2), suitable for spraying a drink of coffee against a side surface extending substantially perpendicular with respect to the surface of a filtering wall (13) of the filter.

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 02/05153A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A47J31/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 638 740 A (CAI ZHIHUA) 17 June 1997 (1997-06-17)  column 6, line 60 -column 10, line 24; figures 4-7 ---	1-11,13, 14, 17-22, 24-27
A	DE 40 37 366 A (BOSCH SIEMENS HAUSGERAETE) 27 May 1992 (1992-05-27) abstract; figures 1,3,4 column 3, line 30 -column 4, line 1 ---	25,26
A	US 4 644 856 A (BORGMANN MICHAEL) 24 February 1987 (1987-02-24) figure 2 --- -/--	24



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance  
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- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
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"&" document member of the same patent family

Date of the actual completion of the international search

4 March 2003

Date of mailing of the international search report

- 7. 03. 2003

Name and mailing address of the ISA

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NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
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Authorized officer

Van Bastelaere, T

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/05153

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	<p>US 6 412 394 B2 (BONANNO FRANCESCO)  2 July 2002 (2002-07-02)</p> <p>column 2, line 14 -column 3, line 50;  figures  -----</p>	<p>1,2,4,  17-22,  25,26</p>

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP 02/05153

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-14, 17-22, 24-26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: Group 1: Independent claims 1,  
25 and 27 and dependent claims 2-14, 17-22, 24,  
26 :

Filter holding cup with threads in the dispenser arranged on the bush.

2. Claims: Group 2: Independent claim 1 and dependent claims  
15-16 :

A filter holding cup with raised ribs for guiding the drink of coffee.

3. Claim : Group 3: Independent claim 1 and dependent claim  
23

A filter holding cup with the rigid element being removably connected on guides integral with the filter.

# INTERNATIONAL SEARCH REPORT

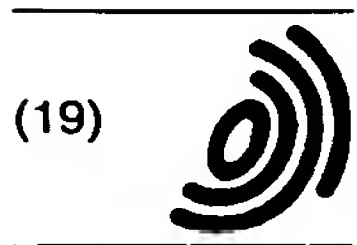
Information on patent family members

International Application No

PCT/EP 02/05153

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Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 1 125 535 A2**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
22.08.2001 Bulletin 2001/34

(51) Int Cl.7: **A47J 31/06**

(21) Application number: **00204293.5**

(22) Date of filing: **04.12.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**  
Designated Extension States:  
**AL LT LV MK RO SI**

(72) Inventor: **Bonanno, Francesco**  
**40041 Gaggio Montano (Bologna) (IT)**

(74) Representative: **Corradini, Corrado et al**  
**Studio Ing. C. CORRADINI & C. S.r.l.**  
**4, Via Dante Alighieri**  
**42100 Reggio Emilia (IT)**

(30) Priority: **07.02.2000 IT BO000051**

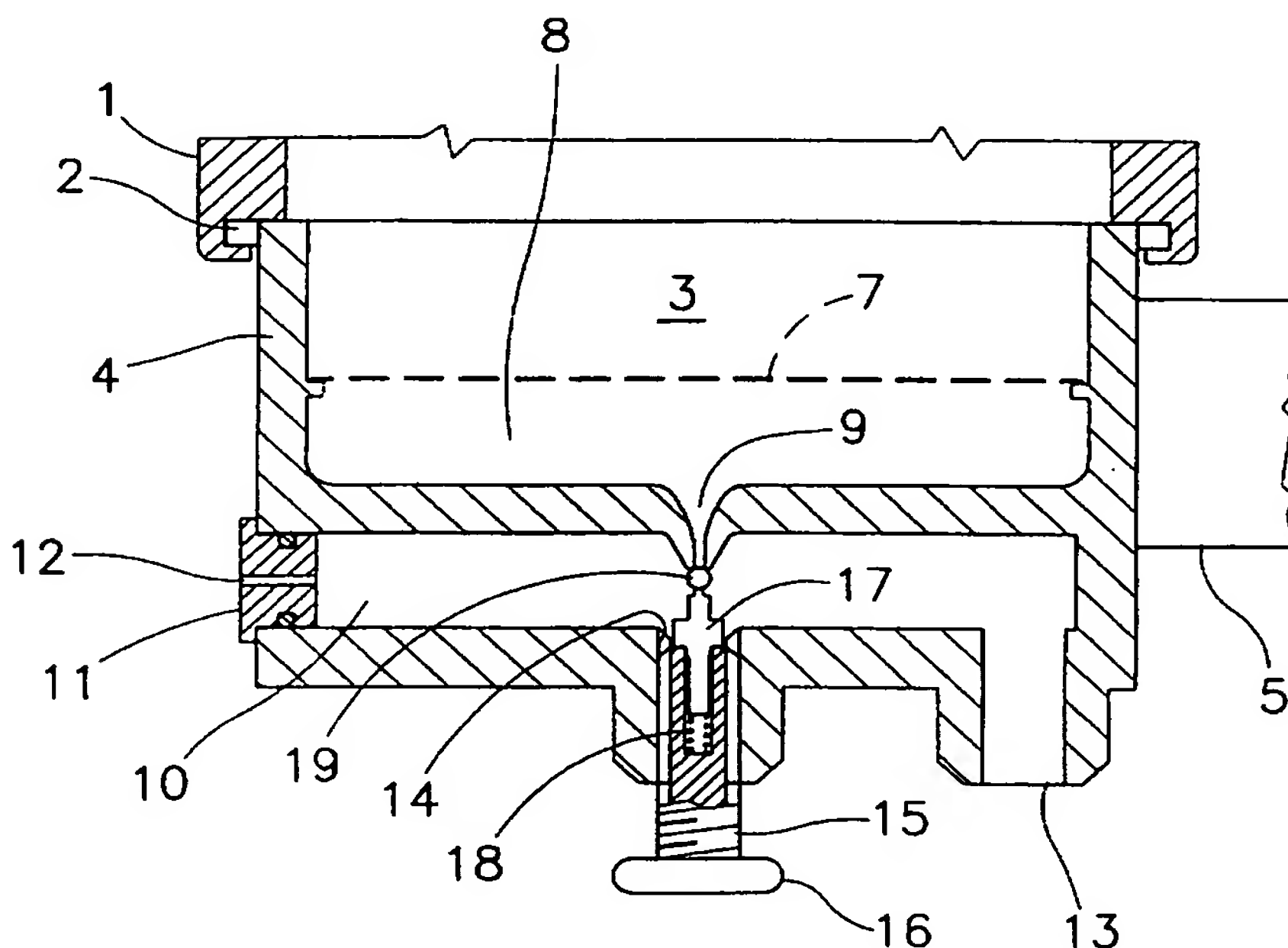
(71) Applicant: **Petroncini Impianti S.R.L.**  
**41100 Modena (IT)**

**(54) Method and device for preparing espresso coffee**

(57) A method for preparing espresso coffee or similar drinks in manual or automatic machines, by causing a forced flow of boiling water to pass through a percolation chamber containing coffee powder, in which an adjustable back pressure is created in the percolation chamber to increase the time of contact between the

powder and the water.

A device for preparing espresso coffee or similar drinks, comprising hot water generating means, a percolation chamber traversed by hot water and intended to contain coffee powder, and a drink exit conduit, in which the conduit is in the form of a nozzle, the outlet of which is throttled by adjustable means.



**FIG. 1**

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## Description

**[0001]** This invention relates to the preparation of espresso coffee, or Italian coffee, by percolating boiling water through a certain lightly pressed quantity of ground roasted coffee in powder form.

**[0002]** It is equally suitable for preparing espresso coffee starting from a single-measure or multi-measure coffee sachet formed of heat-resistant material able to act as a filter.

**[0003]** The invention is also suitable for preparing drinks from coffee substitutes, such as barley or the like.

**[0004]** Hereinafter, reference will be made exclusively to coffee, this term also embracing its substitutes.

**[0005]** Espresso coffee preparation machines for domestic or bar use comprise a hot water generator feeding a percolation chamber containing the coffee powder.

**[0006]** Said chamber commonly comprises the lower filtering wall, for example of perforated stainless steel, and is connected below a top piece through which the boiling water is fed.

**[0007]** Below the filtering wall there is defined a collection chamber for the percolated product which flows to the outside through a spout below which the cup is placed.

**[0008]** The quality of the product obtained depends both on the quality of the powder and on the ability of the operator, who has to press the powder to the correct extent to achieve uniform distribution of the percolating water through the entire coffee mass.

**[0009]** A commonly observed indicator in the user's judgement of the quality of the espresso coffee is the presence of froth, ie a creamy phase above the surface of the liquid phase.

**[0010]** The need to optimize the percolation stage, on which for equal powder quality the quality of the finished product depends, is obvious.

**[0011]** In the known art, in spite of full operator attention, there is a limit to the degree of utilization of the powder, as almost inevitably passages of lesser density form in the powder mass, creating preferential passageways for the hot water, which hence does not sufficiently traverse certain parts of the powder.

**[0012]** Said drawback is also present in automatic machines, in which the manner in which the powder is fed to the percolation chamber often does not ensure uniform water passage through the whole of the coffee powder.

**[0013]** The object of this invention is to propose and provide an espresso coffee preparation method and device which ensures maximum powder utilization and can be easily adapted for the use of any starting substance.

**[0014]** The invention is aimed at both manual machines and automatic machines.

**[0015]** The invention is primarily based on the fact of creating a back pressure of desired value which slows down the flow of the hot water, giving it time to expand throughout the entire mass of powder.

**[0016]** According to the invention, said back pressure is preferably associated with an expansion chamber positioned between the liquid exit nozzle and the coffee delivery spout, the liquid entering this chamber with a certain speed to mix with the air and produce a creamy emulsion giving an enhanced appearance to the drink.

**[0017]** The method of the invention is implemented by devices easily associated with manual or automatic machines.

**[0018]** Said devices enable the object of the invention to be attained by virtue of the characteristics stated in the claims.

**[0019]** The constructional and functional characteristics of the invention will be apparent from the ensuing detailed description illustrating its various methods of implementation, given by way of non-limiting example with the aid of the figures of the accompanying drawings.

**[0020]** Figure 1 is a partly sectional side view of a percolation chamber suitable for manual machines, in its most simple embodiment.

**[0021]** Figure 2 shows an improved embodiment of the percolation chamber of Figure 1.

**[0022]** Figure 3 shows an embodiment of the invention which can be easily associated with an automatic machine.

**[0023]** Figure 4 is an enlarged detail of Figure 3.

**[0024]** Figure 5 shows a possible variant of Figure 4.

**[0025]** Figure 1 shows the top piece 1 of a normal espresso coffee preparation machine, to which the percolation chamber is fixed by the known bayonet connector 2.

**[0026]** This chamber comprises a cup piece 4 provided with a handle 5 and defining a chamber 3 provided with a removable perforated wall 7.

**[0027]** The wall 7 bounds an underlying chamber 8 for collecting the percolated product, from which it emerges through the nozzle 9.

**[0028]** Below the nozzle 9 there is provided an emulsifying chamber 10 which is closed by a plug 11 axially bored at 12, and communicates with the spout 13 through which the drink is delivered to the cup.

**[0029]** The emulsifying chamber 10 comprises a threaded seat 14 coaxial with the nozzle 9, and into which a threaded member 15 provided with operating means 16 is screwed.

**[0030]** The member 15 is axially hollow to receive an axial pin 17 possibly by way of elastic means 18. The pin 17 is provided at its end with a nose piece for closing the nozzle 9, which nose piece can be an elastomeric ball 19 or a steel needle 190 (as in Figure 5).

**[0031]** The nose piece 19, 190 can be rested against the nozzle 9 and be kept pressed by the elastic means 18, or can be positioned at the desired distance from said nozzle by screwing the member 15 into its seat to a greater or lesser extent.

**[0032]** Figure 2 comprises all the means shown in Figure 1, indicated by the same reference numerals.

[0033] The improved embodiment of Figure 2 also comprises an expansion chamber 20 communicating with the duct of the nozzle 9 via a branch 21.

[0034] The chamber 20, of circular cross-section, comprises a sealed piston 22 maintained at that end close to the nozzle 9 by a spring 23 opposed by the plug 24. The plug 24 is bored at 25 and communicates with the outside.

[0035] Figures 3, 4 and 5 show executive details of the aforescribed embodiments, suitable particularly but not exclusively for implementing the invention in automatic machines.

[0036] Those details of Figures 3 to 5 corresponding to the details of Figures 1 and 2 are indicated by the same reference numerals.

[0037] The reference numeral 100 indicates a portion of the body of the automatic espresso coffee preparation machine to which the invention is applied.

[0038] In the illustrated example said portion 100 comprises the hot water delivery duct 101, in front of which the piece 102 is fixed such that the axis of the nozzle 9 is aligned with 101.

[0039] This nozzle is provided within a bush 90 having an axial bore and a circular groove 91 positioned in front of the expansion chamber 20 and communicating with the axial bore of the nozzle 9 via a branch 21.

[0040] Below the nozzle 9 there is an emulsifying chamber 10 which is closed by a plug 11 bored axially at 12, and communicates with the drink delivery spout 13.

[0041] The emulsifying chamber 10 comprises a threaded seat 14 coaxial with the nozzle 9, and into which a threaded member 15 provided with operating means 16 is screwed.

[0042] The member 15 is axially hollow to receive an axial pin 17 possibly by way of elastic means 18. The pin 17 is provided at its end with a nosepiece in the form of an elastomeric ball 19 for closing the nozzle 9.

[0043] The ball 19 can be rested against the nozzle 9 and be kept pressed by the elastic means 18, or can be positioned at the desired distance from said nozzle by screwing the member 15 into its seat to a greater or lesser extent.

[0044] The same applies if a needle 190 is provided instead of the ball.

[0045] In the variant of Figure 5, the throttling means for the nozzle 9 are in the form of a needle 190.

[0046] The invention operates in the following manner. The known procedure is used for coffee percolation.

[0047] According to the invention, by using the operating member 16 to adjust the thrust of the throttling element 19, 190 against the nozzle 9 or its distance from the nozzle 9, a back pressure is created in the percolation chamber 3 which increases the contact time between the hot water and the coffee powder, to ensure optimum utilization of this latter.

[0048] A drink is hence obtained of quality comparatively much better than that obtained with the known sys-

tem, meaning that for equal coffee powder quality a better drink is obtained, or that for equal powder quality less powder can be used.

[0049] The final drink appearance is rich in cream in that in passing through the gap between the nosepiece 19 and the nozzle at great speed, the drink mixes with the air contained in the chamber 10, to emulsify and assume the enhanced creamy appearance which besides facilitating development of the aroma, gives quality to the drink.

[0050] Perfect execution of the process depends to a substantial extent on the diameter of the nozzle 9, which must be as small as possible compatible with the requirements of throughput and the risk of clogging.

[0051] The embodiment shown in Figures 2 and 4 considerably reduces the risk of clogging.

[0052] In this respect, during percolation, that portion of percolated liquid which initially descends and is the least rich in solid particles fills the chamber 20 by overcoming the elastic resistance of the piston 22, which moves towards the left to compress the spring 23.

[0053] When hot water feed is halted at the end of the process, the liquid contained in the chamber 22 is expelled through the nozzle 9 to clean it of any solid parts, while at the same time it acts below the perforated wall 7 to free any perforations clogged with coffee powder.

## Claims

1. A method for preparing espresso coffee or similar drinks in manual or automatic machines, by causing a forced flow of boiling water to pass through a percolation chamber containing coffee powder, characterised in that an adjustable back pressure is created in the percolation chamber to increase the time of contact between the powder and the water.
2. A method as claimed in claim 1, characterised in that on its exit from the percolation chamber the liquid is throttled within an air-rich environment to facilitate creation of a creamy emulsion.
3. A device for preparing espresso coffee or similar drinks, comprising hot water generating means, a percolation chamber traversed by hot water and intended to contain coffee powder, and a drink exit conduit, characterised in that the conduit is in the form of a nozzle, the outlet of which is throttled by adjustable means.
4. A device as claimed in claim 3, characterised in that the nozzle opens into an atmospheric pressure chamber which communicates with the outside and in which the liquid falling from a delivery spout is collected.
5. A device as claimed in claim 3, characterised in that

said atmospheric pressure chamber comprises, co-axial with the nozzle, a threaded seat into which a member provided with externally located operating means and carrying said throttling means is screwed.

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6. A device as claimed in claim 5, characterised in that said throttling means are a rubber nosepiece.

7. A device as claimed in claim 5, characterised in that said throttling means are a needle-shaped pin.

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8. A device as claimed in claim 3, characterised by comprising an expansion chamber communicating with the nozzle.

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9. A device as claimed in claim 8, characterised in that the nozzle is formed within an axially bored bush comprising an outer circumferential groove communicating with the axial bore of the nozzle via a radial duct.

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10. A device as claimed in claim 9, characterised in that said radial groove communicates with the expansion chamber.

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11. A device as claimed in claim 8, characterised in that the expansion chamber is a cylindrical chamber open outwards at one end and containing a sealed piston opposed by a spring.

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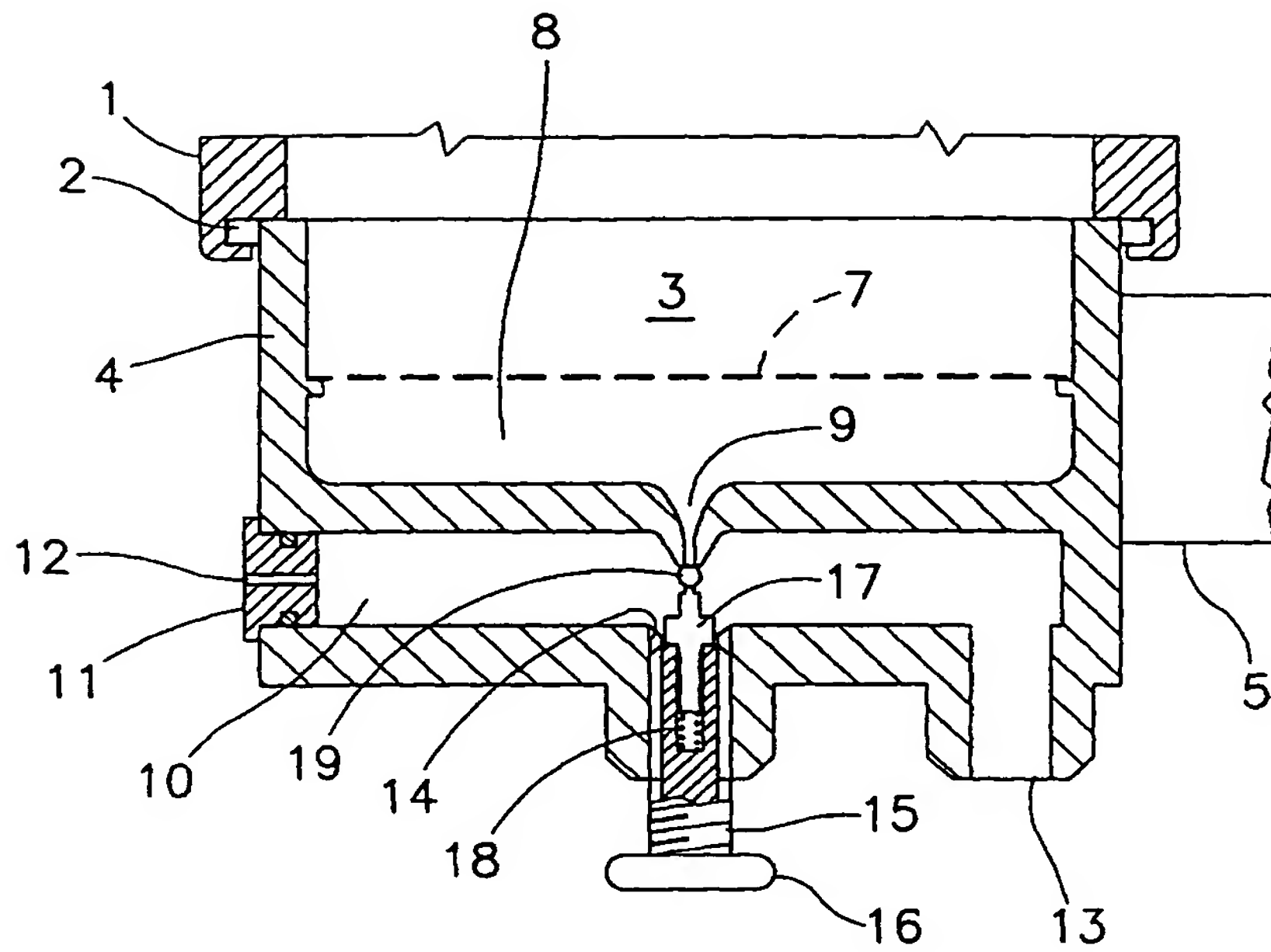


FIG.1

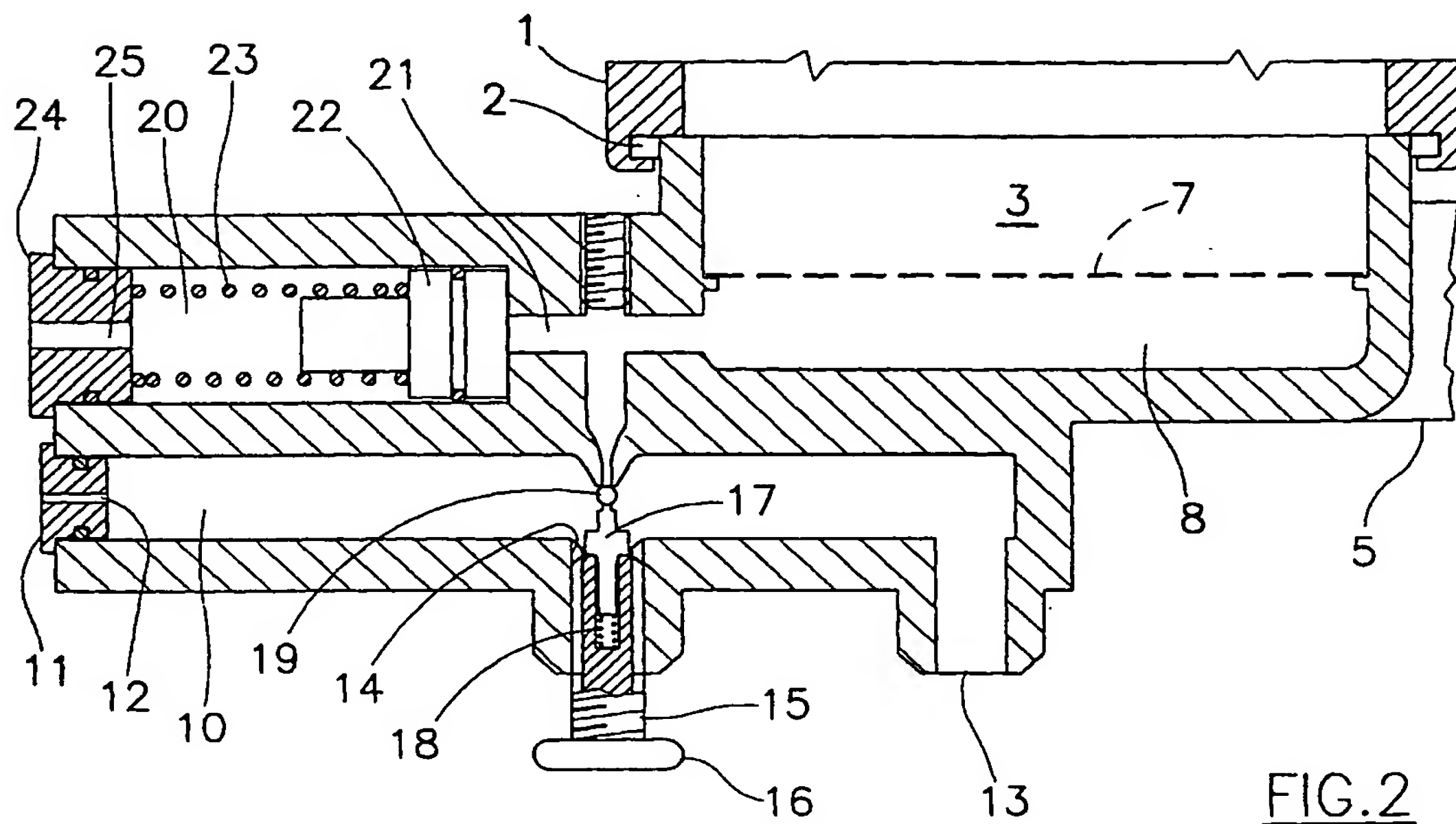


FIG.2

FIG.3

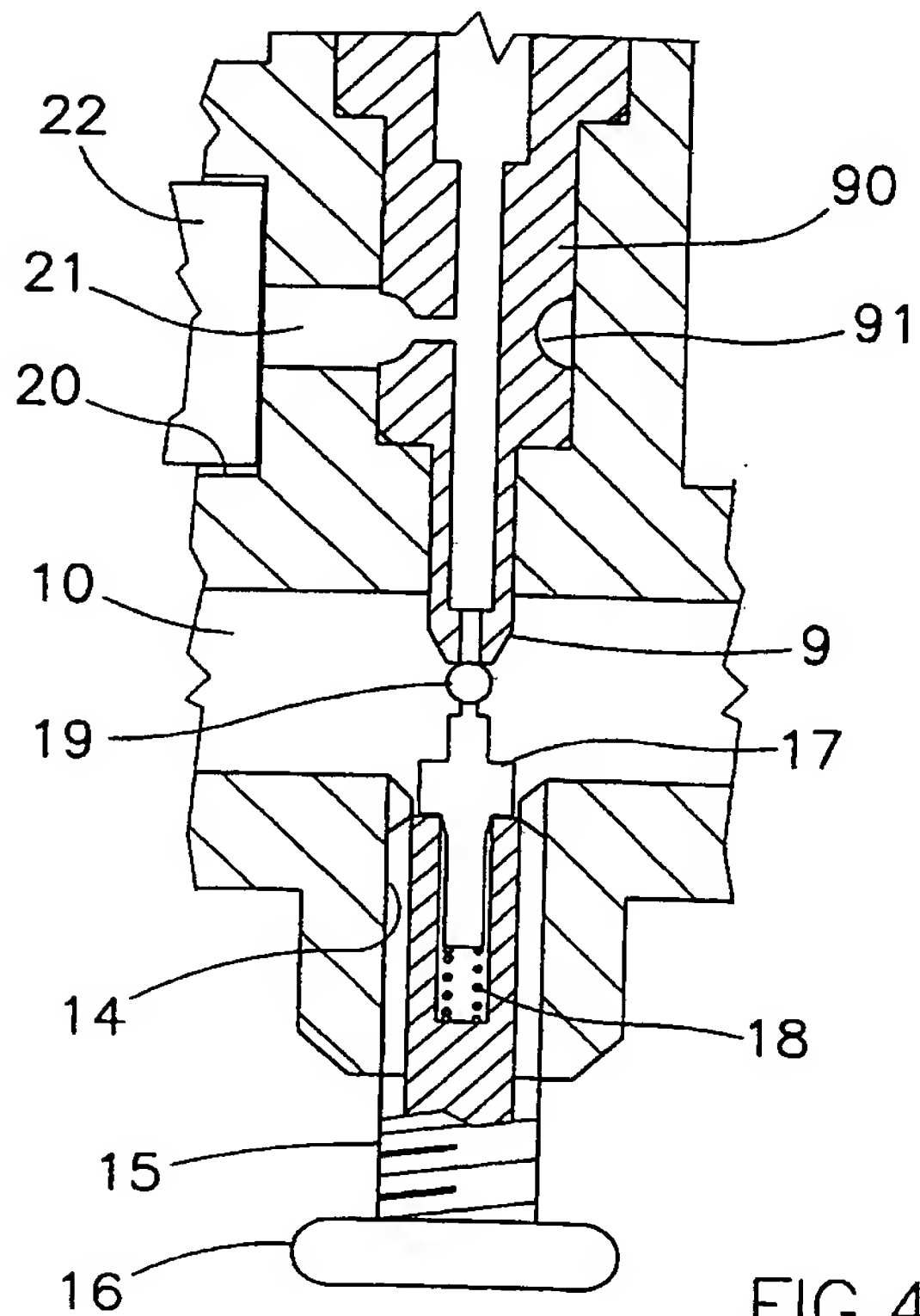
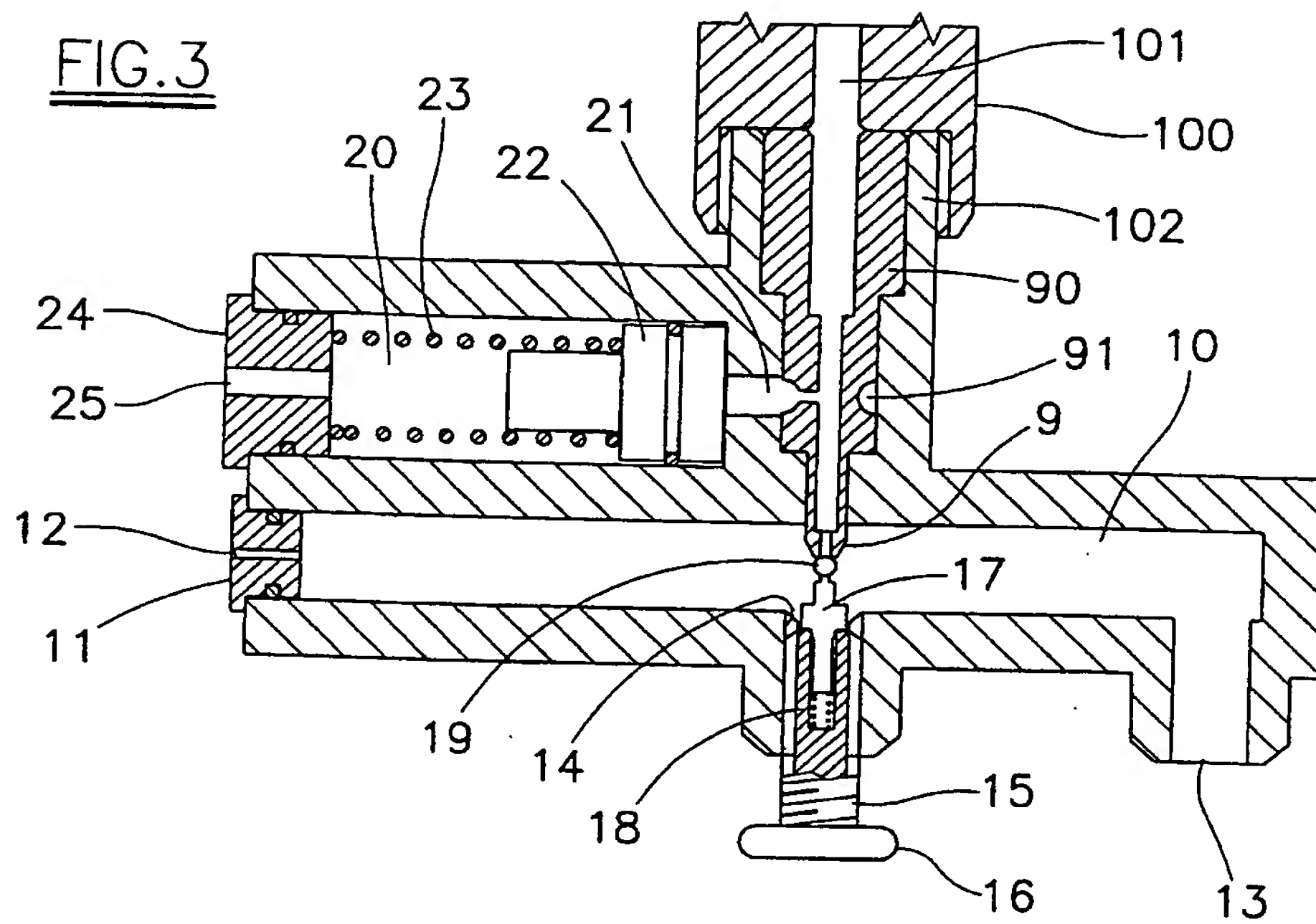


FIG.4

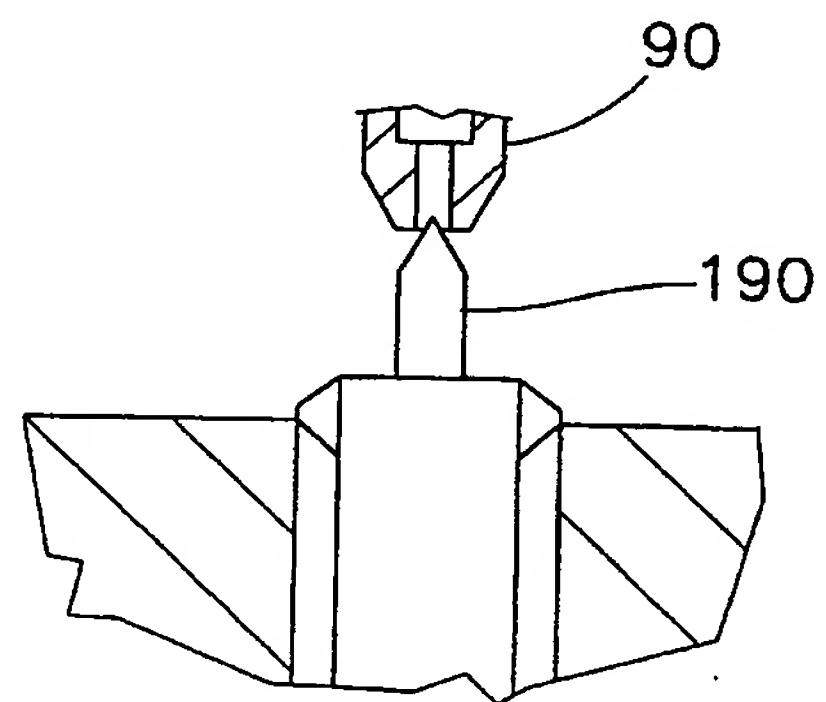
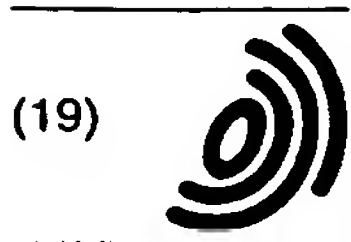


FIG.5





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(11) **EP 1 125 535 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
17.10.2001 Bulletin 2001/42

(51) Int Cl.<sup>7</sup>: **A47J 31/06, B05B 15/02**

(43) Date of publication A2:  
22.08.2001 Bulletin 2001/34

(21) Application number: **00204293.5**

(22) Date of filing: **04.12.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU**  
**MC NL PT SE TR**  
Designated Extension States:  
**AL LT LV MK RO SI**

(72) Inventor: **Bonanno, Francesco**  
**40041 Gaggio Montano (Bologna) (IT)**

(74) Representative: **Corradini, Corrado et al**  
**Studio Ing. C. CORRADINI & C. S.r.l.**  
**4, Via Dante Alighieri**  
**42100 Reggio Emilia (IT)**

(30) Priority: **07.02.2000 IT BO000051**

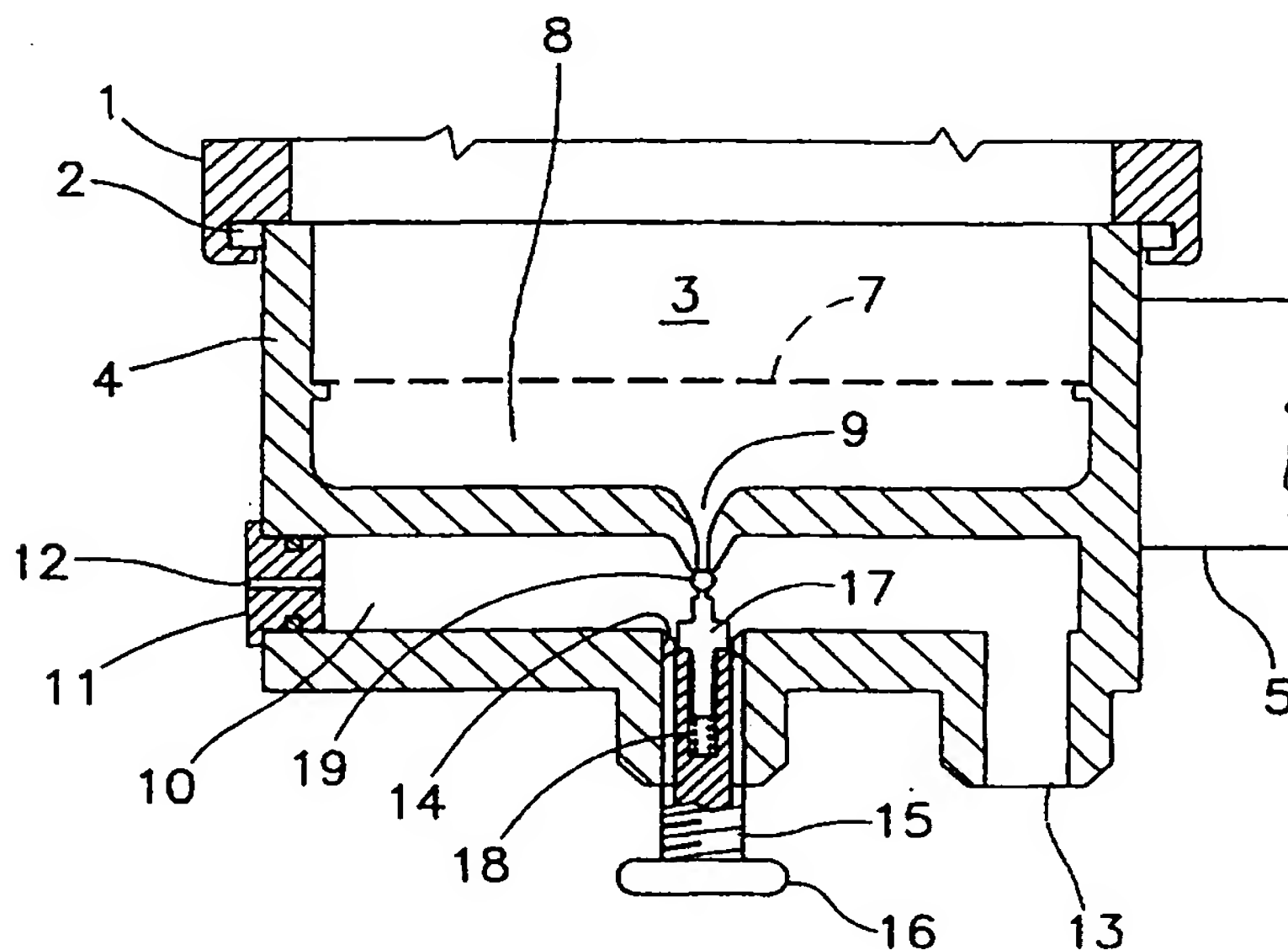
(71) Applicant: **Petroncini Impianti S.R.L.**  
**41100 Modena (IT)**

(54) **Method and device for preparing espresso coffee**

(57) A method for preparing espresso coffee or similar drinks in manual or automatic machines, by causing a forced flow of boiling water to pass through a percolation chamber (3) containing coffee powder, in which an adjustable back pressure is created in the percolation chamber (3) to increase the time of contact between the

powder and the water.

A device for preparing espresso coffee or similar drinks, comprising hot water generating means, a percolation chamber (3) traversed by hot water and intended to contain coffee powder, and a drink exit conduit, in which the conduit is in the form of a nozzle (9), the outlet of which is throttled by adjustable means (19).



**FIG. 1**

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# EUROPEAN SEARCH REPORT

Application Number  
EP 00 20 4293

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	* column 3, line 34 - column 6, line 22 *		
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Y	* column 4, line 58 - line 62; figure 2 *	5	
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The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>10 July 2001</b>	Examiner <b>Lehe, J</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04001)



European Patent  
Office

Application Number

EP 00 20 4293

#### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

#### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



European Patent  
Office

**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
EP 00 20 4293

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-7
2. Claims: 1-3,8-11

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 00 20 4293

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-07-2001

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